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FIG. 1

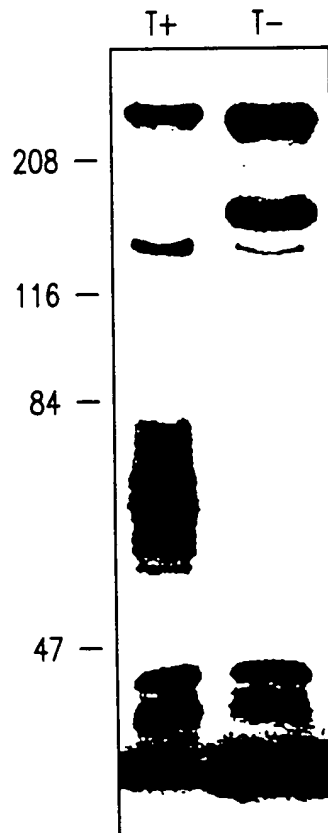
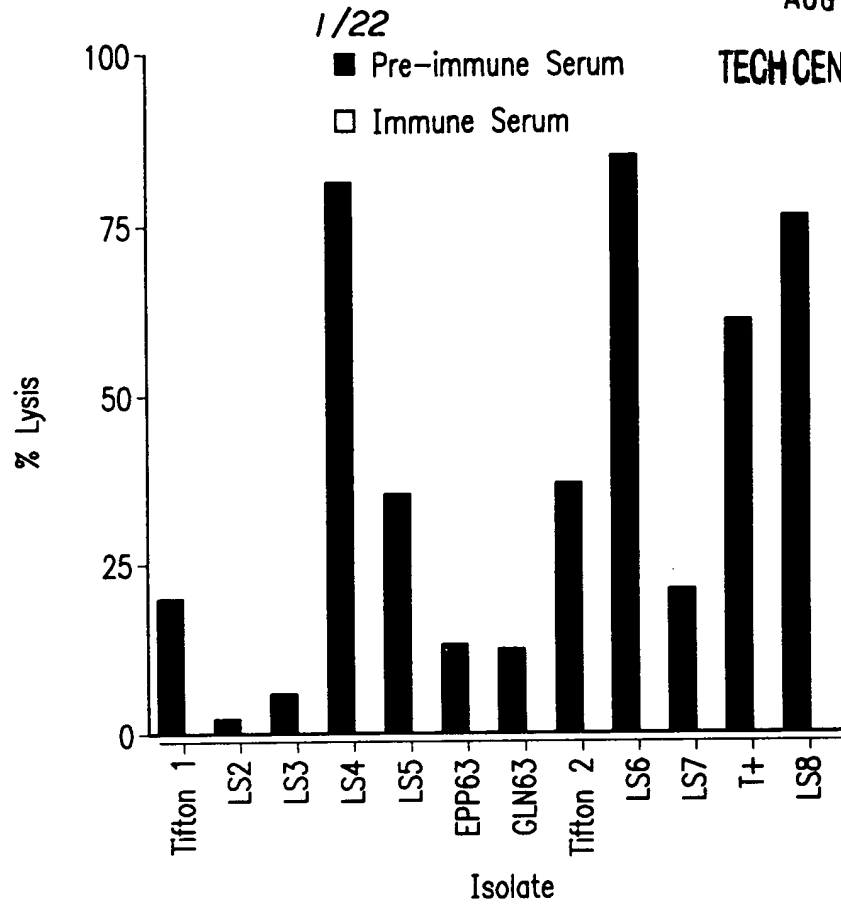


FIG. 2



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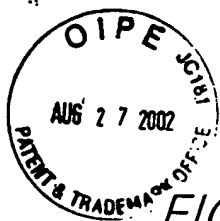
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FIG. 3-1

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1 ATGTCCAATATAAATGTAATTAATCTAATATTCAAGCAGGCTTGAATTCAACAAAGTCT 60  
1 M S N I N V I K S N I Q A G L N S T K S 20  
61 GGATTAATAAATCTTTACTTGGCTATTCCCAAAGATTATGATCCGCAAAAAGGTGGGACT 120  
21 G L K N L Y L A I P K D Y D P Q K G G T 40  
121 TTAAATGATTTTATTAAGCTGCTGATGATTAAGGTAATGCTGTTTACGAGAAGAGCCT 180  
41 L N D F E K A A D E L G I A R L A E E P 60  
181 AATCACA CTGAAACAGCAAAAAAATCTGTTGACACAGTAAATCAGTTTCTCTCTCACA 240  
61 N H T E T A K K S V D T V N Q F L S L T 80  
241 CAAACTGGTATTGCTATTTCTGCAACAAAATTAGAAAAGTTCTTACAAAAACATTCTACC 300  
81 Q T G I A I S A T K L E K F L Q K H S T 100  
301 AATAAGTTAGCCAAAGGGTTAGACAGTGTAGAAAATATTGATCGTAAATTAGGTAAAGCA 360  
101 N K L A K G L D S V E N I D R K L G K A 120  
361 AGTAATGTATTATCAACATTAAGCTCTTTTTTGGGCACTGCATTAGCGGGTATAGA ACTT 420  
121 S N V L S T L S S F L G T A L A G I E L 140  
421 GATTCTTTAATCAAAAAAGGTGATGCTGCACCTGATGCTTTGGCTAAAGCTAGTATTGAC 480  
141 D S L I K K G D A A P D A L A K A S I D 160  
481 TTGATTAATGAGATAATTGGTAATCTATCTCAGAGTACTCAAACGATTGAAGCATTTTCT 540  
161 L I N E I I G N L S Q S T Q T I E A F S 180  
541 TCACAGTTAGCAAAGTTAGGTTCTACTATATCGCAGGCTAAAGGCTTCTCTAATATAGGA 600  
181 S Q L A K L G S T I S Q A K G F S N I G 200  
601 AACAAAGTTGCAAACTTAAATTTTTCTAAAACAAATCTTGGTTTGGAAATAATTACTGGT 660  
201 N K L Q N L N S S K T N L G L E I I T G 220  
661 TTGCTATCAGGCATTTCTGCAGGCTTTGCTTTAGCGGATAAAAAATGCATCGACTGGCAAA 720  
221 L L S G I S A G F A L A D K N A S T G K 240  
721 AAAGTTGCTGCAGGTTTTGAATTAAGCAATCAAGTTATTGGTAATGTAACAAAAGCAATT 780  
241 K V A A G F E L S N Q V I G N V T K A I 260  
781 TCTTCATATGTTTTAGCACACGTGTTGCTGCTGGTCTATCAACTACTGGTGCTGTTGCT 840  
261 S S Y V L A Q R V A A G L S T T G A V A 280  
841 GCTTTAATTACTTCATCGATTATGTTGGCAATTAGTCCTTTGGCATTATGAATGCAGCA 900  
281 A L I T S S I M L A I S P L A F M N A A 300  
901 GATAAATCAATCATGCTAATGCTCTTGATGAGTTTGCAAAACAATTCCGAAAATTTGGC 960  
301 D K F N H A N A L D E F A K Q F R K F G 320



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FIG. 3-2

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961 TATGATGGGGATCATTTATTGGCTGAATATCAGCGTGGTGTGGGTACTATTGAAGCTTCA 1020  
321 Y D G D H L L A E Y Q R G V G T I E A S 340

1021 TTA ACTACAATTAGTACGGCATTAGGTGCAGTTTCTGCTGGTGTTCGCTGCTGCTGTA 1080  
341 L T T I S T A L G A V S A G V S A A A V 360

1081 GGATCTGCTGTTGGTGCACCGATTGCACTATTAGTTGCAGGTGTTACAGGATTGATCTCT 1140  
361 G S A V G A P I A L L V A G V T G L I S 380

1141 GGAATTTTAGAAGCGTCTAAACAGGCAATGTTTGAAAGTGTGCTAACCGTTTACAAGGT 1200  
381 G I L E A S K Q A M F E S V A N R L Q G 400

1201 AAAATTTTAGAGTGGGAAAAGCAAATGGCGGTCAGAACTATTTTGATAAAGGCTATGAT 1260  
401 K I L E W E K Q N G G Q N Y F D K G Y D 420

1261 TCTCGTTATGCTGCTTATTTAGCTAATAACTTAAATTTTGTCTGAGCTAAATAAAGAG 1320  
421 S R Y A A Y L A N N L K F L S E L N K E 440

1321 TTGAAGCTGAACGTGTTATTGCAATCACCCAACAACGTTGGGATAATAATATTGGTGAG 1380  
441 L E A E R V I A I T Q Q R W D N N I G E 460

1381 TTAGCAGGTATTACCAAATTGGGTGAACGCATTAAGAGCGGAAAAGCTTATGCAGATGCT 1440  
461 L A G I T K L G E R I K S G K A Y A D A 480

1441 TTTGAAGATGGCAAGAAAGTTGAAGCTGGTTCCAATATTACTTTGGATGCTAAACTGGT 1500  
481 F E D G K K V E A G S N I T L D A K T G 500

1501 ATCATAGACATTAGTAATTCAAATGGGAAAAAAACGCAAGCGTTGCATTTCACTTCGCCT 1560  
501 I I D I S N S N G K K T Q A L H F T S P 520

1561 TTGTTAACAGCAGGAAGTGAATCACGTGAACGTTTAACTAATGGTAAATACTCTTATATT 1620  
521 L L T A G T E S R E R L T N G K Y S Y I 540

1621 AATAAGTTAAATTCGGACGTGTAAAAAACTGGCAAGTTACAGATGGAGAGGCTAGTTCT 1680  
541 N K L K F G R V K N W Q V T D G E A S S 560

1681 AAATTAGATTTCTCTAAAGTTATTCAGCGTGTAGCCGAGACAGAAGGCACAGACGAGATT 1740  
561 K L D F S K V I Q R V A E T E G T D E I 580

1741 GGTCTAATAGTAAATGCAAAAGCTGGCAATGACGATATCTTTGTTGGTCAAGGTAAATG 1800  
581 G L I V N A K A G N D D I F V G Q G K M 600

1801 AATATTGATGGTGGAGATGGACACGATCGTGTCTTCTATAGTAAAGACGGAGGATTTGGT 1860  
601 N I D G G D G H D R V F Y S K D G G F G 620

1861 AATATTACTGTAGATGGTACGAGTGCAACAGAAGCAGGCAGTTATACAGTTAATCGTAAG 1920  
621 N I T V D G T S A T E A G S Y T V N R K 640



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FIG. 3-3

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1921 GTTGCTCGAGGTGATATCTACCATGAAGTTGTGAAGCGTCAAGAAACCAAGGTGGGTAAA 1980  
641 V A R G D I Y H E V V K R Q E T K V G K 660

1981 CGTACTGAAACTATCCAGTATCGTGATTATGAATTAAGAAAAGTTGGGTATGGTTATCAG 2040  
661 R T E T I Q Y R D Y E L R K V G Y G Y Q 680

2041 TCTACCGATAATTTGAAATCAGTAGAAGAAGTAATGGTTCTCAATTAATGATGTATTC 2100  
681 S T D N L K S V E E V I G S Q F N D V F 700

2101 AAAGGTTCTAAATTCAACGACATATTCATAGTGGTGAAGGTGATGATTTACTCGATGGT 2160  
701 K G S K F N D I F H S G E G D D L L D G 720

2161 GGTGCTGGTGACGACCGCTTGTGGTGGTAAAGGCAACGATCGACTTTCTGGAGATGAA 2220  
721 G A G D D R L F G G K G N D R L S G D E 740

2221 GGCGATGATTTACTCGATGGCGTTCTGGTGATGATGATTAAATGGTGGTCTGGTAAT 2280  
741 G D D L L D G G S G D D V L N G G A G N 760

2281 GATGTCTATATCTTTCGAAAGGTGATGGTAATGATACTTTGTACGATGGCACGGGCAAT 2340  
761 D V Y I F R K G D G N D T L Y D G T G N 780

2341 GATAAATTAGCATTTGCAGATGCAATATATCTGATATTATGATTGAACGTACCAAAGAG 2400  
781 D K L A F A D A N I S D I M I E R T K E 800

2401 GGTATTATAGTTAAACGAAATGATCATTGAGGTAGTATTAACATACCAAGATGGTACATA 2460  
801 G I I V K R N D H S G S I N I P R W Y I 820

2461 ACATCAAATTTACAAAATTATCAAAGTAATAAACAGATCATAAAATTGAGCAACTAATT 2520  
821 T S N L Q N Y Q S N K T D H K I E Q L I 840

2521 GGTAAAGATGGTAGTTATATCACTTCCGATCAAATTGATAAAATTTGCAAGATAAGAAA 2580  
841 G K D G S Y I T S D Q I D K I L Q D K K 860

2581 GATGGTACAGTAATTACATCTCAAGAATTGAAAAAGCTTGCTGATGAGAATAAGAGCCAA 2640  
861 D G T V I T S Q E L K K L A D E N K S Q 880

2641 AAATTATCTGCTTCGGACATTGCAAGTAGCTTAAATAAGCTAGTTGGGTCAATGGCACTA 2700  
881 K L S A S D I A S S L N K L V G S M A L 900

2701 TTTGGTACAGCAAATAGTGTGAGTTCTAACGCCTTACAGCCAATTACACAACCAACTCAA 2760  
901 F G T A N S V S S N A L Q P I T Q P T Q 920

2761 GGAATTTTGGCTCCAAGTGTITAG SEQ ID NO. 1 2784  
921 G I L A P S V \* SEQ ID NO. 2 928



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MbxA	38
Lkta	59
ApXIIA	62
H1YA	61
MbxA	103
Lkta	121
ApXIIA	125
H1YA	124
MbxA	163
Lkta	180
ApXIIA	185
H1YA	189
MbxA	227
Lkta	245
ApXIIA	250
H1YA	253
MbxA	292
Lkta	310
ApXIIA	315
H1YA	318
MbxA	357
Lkta	375
ApXIIA	380
H1YA	383

FIG. 4-1



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FIG. 4-2

MbxA	AAAGSAGCAP	IAALVAGVAG	ELSGLEASK	QAMFEHVANK	LOGKLEMEK	QNGSQNYEDK	EYDSR	422
Lkta	AAAGSVIASP	IAALVSGITG	VISTLEASK	QAMFEHVANK	INHKTVEHEK	NNHCKNYFEN	BYDAR	440
ApXIIA	ASAGSLAGAP	VALVAGVAG	ELITTEASK	QAMFEHVANK	VHBRVVEHEK	.KHKNVFEQ	GYSBR	444
H1YA	AAATTSVAGP	VSAVAGVAG	ELITTEASK	QAMFEHVANK	MADVLAEMEKE	.KHKNVFEQ	GYDAR	447
peak 23								
MbxA	YAAVLAANLK	ELSELNKELE	AERVIALTOO	RHDNNICEA	BITKIGERIK	SGKAYADAE	DERKV	487
Lkta	YLANLODNMK	ELNLNKELO	AERVIALTOO	QHDNNTGDLA	QTSRCEKMLE	SGKAYADAE	EGKHI	505
ApXIIA	HLADLODNMK	ELNLNKELO	AERVIALTOO	RHDNNTGDLA	AHSRTDKIS	SGKAYADAE	EGDHO	509
H1YA	HAALFEDNFK	ELNLNKELO	VERSVLLTOO	HWDTLGELE	GVTRNGDNTLE	SGKAYADAE	EGKRL	512
* 2-4								
MbxA	EEAG....SNI	TEPARIGETD	LSNSNGKXIQ	ALHETSPLT	AGTBSRRLI	NEKNSLTKK	KISRV	548
Lkta	KAG....KLI	QDSANGITD	VNSNGKAKIQ	HILLERTRIT	PGTEHRRVQ	TEKMEYTKI	NNRV	566
ApXIIA	SYD....SSV	QDNKNGTIN	ISNTNR.KIQ	SVLETRBELT	PGTEHRRVQ	EGKNSLTKI	HIDRV	569
H1YA	EKKPDEFQKQ	VFDPLKGNID	LSDS..KSST	LEKRETPLET	PGTEHRRVQ	SGKAYADAE	LVKGM	575
1								
MbxA	KNMVTD..GE	ASSKLDIESKM	IORVA...ET	EQ....TDEI	GLLVNAKAGN	DDIFVGOEKM	NEDGG	605
Lkta	BSMKITTD..GA	ASSITFDLTNY	VORIGIELDN	AGNVTKIKET	KITAKIGEGD	DNVFGGSET	EDGG	630
ApXIIA	BSNVTD..GD	ASSSVDETNY	VORLAKKFD	AGNIESKOT	KITAKIGAGN	DNVFGGSET	VNDGG	633
H1YA	QKLVKGVQD	KGSVYVYSNJL	IQHASV....	.EN.NQYREI	RHESHGDS	DKHLSAGSA	KLYAG	634
*								
MbxA	QGHORVHYSK	DGGFENJIMP	GTSAREAGSY	LVNRK..ARG	DLYHEVVRQ	ETKIGKRITET	TDYRD	669
Lkta	EGYDRVHYSR	.ENKGAETD	ATREKEDSY	LVNRK..ETE	KACHEVTSIH	TALGNREK	DEVR.	692
ApXIIA	QGHORVHYSR	.GEYBALVID	ATREKEDSY	SVKRYV..GDS	KACHEVTSIH	QDNVNRREK	DEVR.	695
H1YA	KGHVVMYVDK	T.DTGYLTID	GEKATREAGNY	LVNLVLCQBV	KVLEKREKQ	EVSVSKRTER	TOVRS	698



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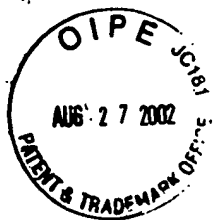
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peak 26

MbxA	YEELRV.GYG	QOSTDNKSV	EEVIGSQEND	VEKGSKENDI	FHSCEEDPLL	BGGASDRL	GGKGN	733
Lkta	HSNNQH.HAG	MYTKDILKAN	EEVIGTSHND	TEKGSKENDI	FHGGGVDFT	BGGASDRL	GGKGN	756
ApXIIA	REDDRF.HTG	YVIVDSLSKV	EEVIGSQEND	TEKGSKENDI	FHGGGVDFT	BGGASDRL	GGKGN	759
H1YA	YEFTHINGKN	LEITDNLVSV	EEVIGTSHND	TEKGSKENDI	FHGGGVDFT	BGGASDRL	GGKGN	763
MbxA	DRISQDEGD	.....	.....	.....	.....	.....	.....	742
Lkta	DILEDGGND	.....	.....	.....	.....	.....	.....	765
ApXIIA	DVIDGGNGN	.....	.....	.....	.....	.....	.....	768
H1YA	DIESGGNGDD	QLYGGDNDK	LIGGAGNNYL	NGGDGDELQ	VQNSLAKNV	LSGGKNDKL	YGSEG	828
MbxA	DLEDGGSGD	QVINGGAGND	WVIFRKGCGN	DTILYEGTG.N	OKLAFAADANL	SPMTERKE	GIIVK	805
Lkta	DFTGGGKGN	DLEHGGKGD	TFVHRKGCGN	DTILYEGTG.N	OKLAFAADANL	SPMTERKE	GIIVK	827
ApXIIA	NFVVGTCN	DTISGGKND	TFVHRKGCGN	DTILYEGTG.N	OKLAFAADANL	SPMTERKE	GIIVK	830
H1YA	ADLDGGEGN	DLEHGGKGD	TFVHRKGCGN	DTILYEGTG.N	OKLAFAADANL	SPMTERKE	GIIVK	893
MbxA	RND.....	HSGSINIPRW	Y.....ITSNL	QVQSNKTDH	KTEOLIGKDG	SYTSGQIDK	TEQDK	859
Lkta	TNS.....	KKEKVTQNN	Y.....ITSNL	QVQSNKTDH	KTEOLIGKDG	SYTSGQIDK	TEQDK	882
ApXIIA	INQ.....	KGEKVRIGNN	Y.....ITSNL	QVQSNKTDH	KTEOLIGKDG	SYTSGQIDK	TEQDK	885
H1YA	KAEKNVLSIG	HKNGITFKNN	Y.....ITSNL	QVQSNKTDH	KTEOLIGKDG	SYTSGQIDK	TEQDK	949
MbxA	KDGTVITSQ	LKRLADENK	QRLSASDIAS	SENKVGSMMA	UFGTANSVSS	NAEQITQPT	QGITIA	924
Lkta	KNGKIDDE	LSKVNDEL	LK.HSKNVTN	SLDKLSSVS	AR.FSSNDSR	NVE..VA.PT	SMED	941
ApXIIA	ENNOESAEA	LSKVNDYNT	SK.DRONVSN	SLAKLSSVS	SE.FSSSDFR	NNGTIV.PS	S.ID	945
H1YA	QSNK.ABYV	YGNDAIAYGS	.QGNLNPLIN	ELSKLISAL	NPDVKEERAA	ASELQSG.N	ASDES	1011
MbxA	PRV.....	.....	.....	.....	.....	.....	.....	927
Lkta	QSLSLQFAR	AA	.....	.....	.....	.....	.....	953
ApXIIA	VS.NINQFAR	AA	.....	.....	.....	.....	.....	956
H1YA	YGRNSHITA	SA	.....	.....	.....	.....	.....	1023

FIG. 4-3



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FIG. 5

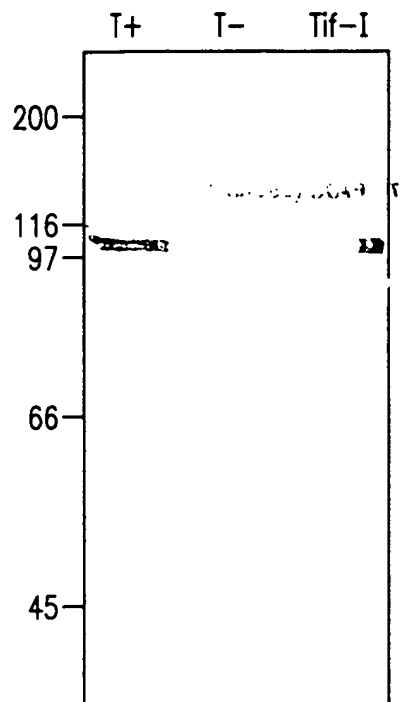
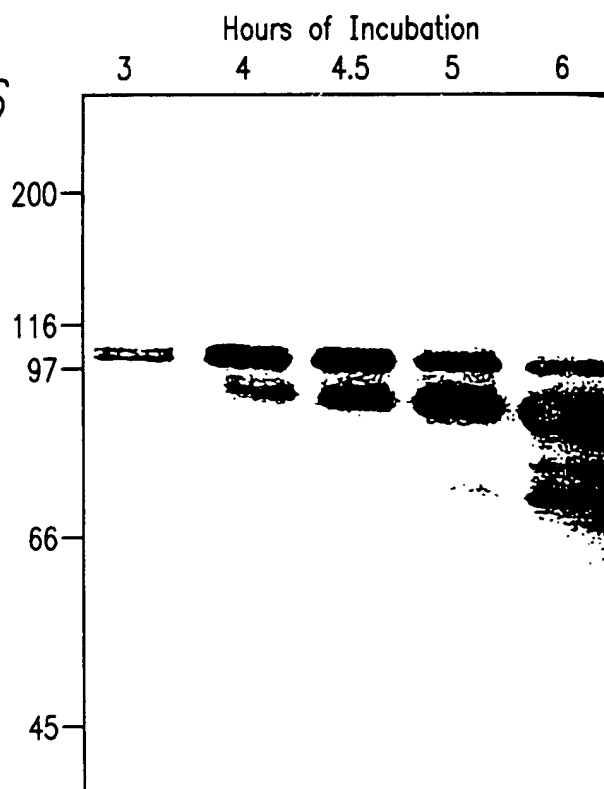


FIG. 6







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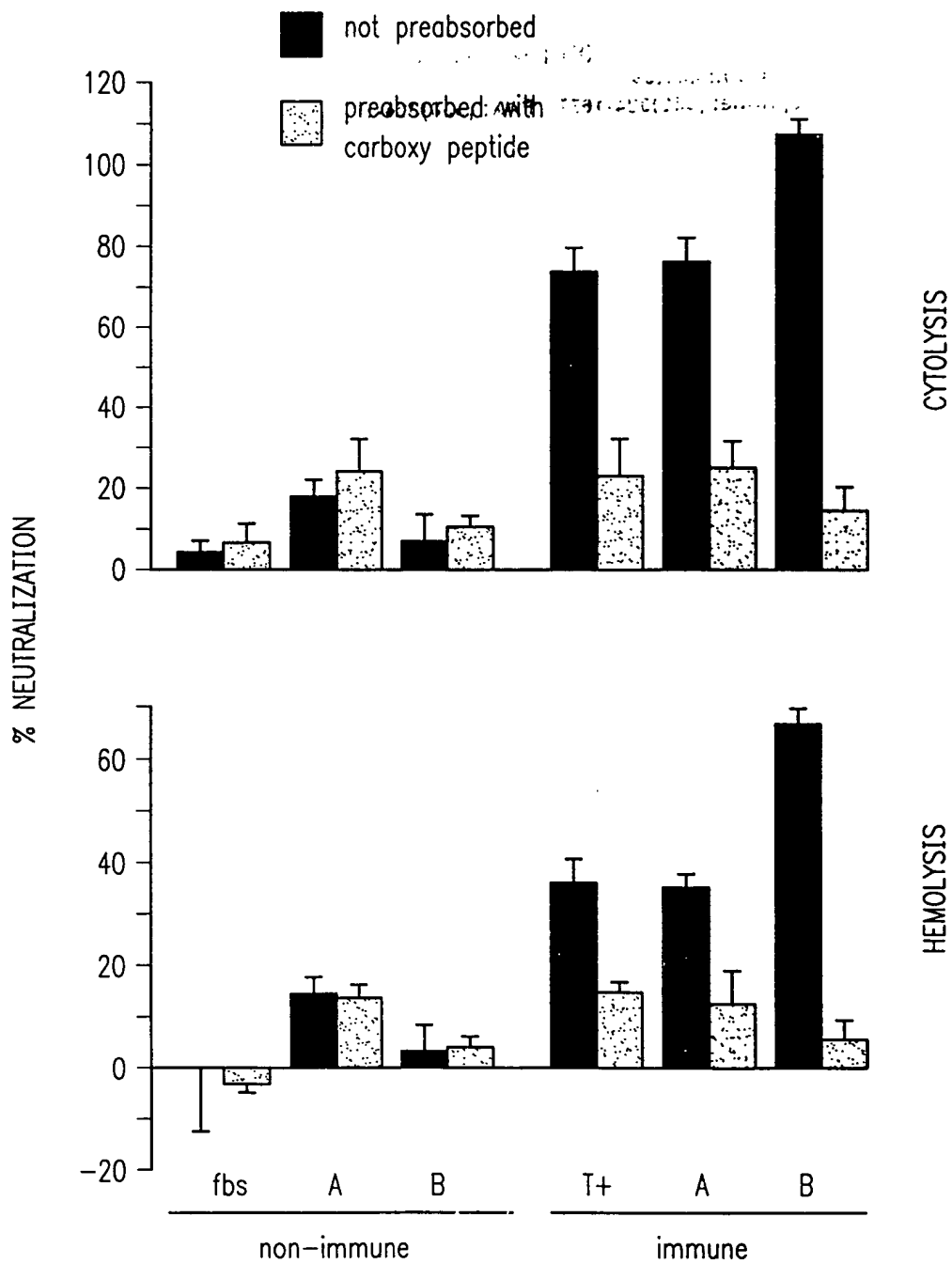


FIG. 7



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FIG. 8-1

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1 ATGGGTGGTGATACTTCTTTAATTAGACTTAATTTACAAACCCTTAATAGTAATTTAGTT 60  
1 M G G D T S L I R N L Q T L N S N L V 20

61 ATGATAGATTATGCTCAACAACCTGCTCTATCTGCTCTGGTTATCCTTGCCAAATACTAT 120  
21 M I D Y A Q Q P A L S A L V I L A K Y Y 40

121 GGTATTTCTGCAAGTCCAGCAGACATTATGCATCAGTTTTCTGATAATACAAAAGGAGAC 180  
41 G I S A S P A D I M S H Q F F S T D N S T A K G D 60

181 CTGAATGAAATTGAATGGATGTTGGCAGCAAAGAAATTAGAATTAAGGTAAAGATTATA 240  
61 L N E I E W M L A A K K L E L K V K I I 80

241 AAACAGCCTTTAACTCGATTGTCAATGATAACACTTCTGCTTTGGTGTGGTGTGATAAT 300  
81 K Q P L T R L S M I T L P A L V W C D N 100

301 AAGCCCGATTTAGATCAAAATTTAACTCTCATTTTATACTAACTAAAATTGATGGGGTG 360  
101 K P D L D Q N L N S H F I L T K I D G V 120

361 GGATCTGCTGCAAAATATCTCATCTACGATTTGATTGAGAATCGTCCATAATATTAGAT 420  
121 G S A A K Y L I Y D L I E N R P I I L D 140

421 GCAAGTGAGTTTTCTGAAAGATATTCTGGTAAGTTAATGCTAGTAACTTCCCGTGCGTCA 480  
141 A S E F S E R Y S G K L M L V T S R A S 160

481 ATATTGGGTTTCATTGGCTAAATTTGATTTTACTTGGTTTATTCCTGCGGTAATCAAATAT 540  
161 I L G S L A K F D F T W F I P A V I K Y 180

541 CGTTATATTTTTTTGAAGTCATCGTTATTTTCAGTGGTGCTACAGATTTTTGCTCTGATT 600  
181 R Y I F F E V I V I S V V L Q I F A L I 200

601 ACGCCATTGTTTTTTCAGGTTGTGATGGATAAGGTATTGGTGCATCGTGGTTTTTCTACT 660  
201 T P L F F Q V V M D K V L V H R G F S T 220

661 CTGGATGTGGTAGCGATTGCCTTGTGGTAGTAAGTTTATTTGAAGTCATTTTAAGTGGT 720  
221 L D V V A I A L L V V S L F E V I L S G 240

721 CTACGCACTTATATTTTTGCTCATACAACCTCTCGAATTGATGTAGAGCTAGGAGCACGA 780  
241 L R T Y I F A H T T S R I D V E L G A R 260

781 TTATTTTCGTCATCTATTAGCTCTACCGCTTGCTTATTTTGAGAGTAGAAGAGTAGGCGAT 840  
261 L F R H L L A L P L A Y F E S R R V G D 280

841 ACAGTTGCACGTATACGTGAATTGGAACATATCCGCAATTTCTTAACTGGTCAAGCTCTC 900  
281 T V A R I R E L E H I R N F L T G Q A L 300

901 ACTTCAGTTTTAGATTTGGTGTTTTCTTTTATATCTTGTTTGTAATGTGGTATTACAGC 960  
301 T S V L D L V F S F I F L F V M W Y Y S 320



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FIG. 8-2

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961 CCTACTTTAACTGGTAGTTTTGGCATCATTACCAATATATGCGTTTTGGTCTGCCTTT 1020  
321 P T L T L V V L A S L P I Y A F W S A F 340

1021 ATTAGCCCAATTTTACGCACTCGACTAAATGATCAATTTGCACGCAATGCAGATAATCAA 1080  
341 I S P I L R T R L N D Q F A R N A D N Q 360

1081 TCTTTTTTAGTGAAAGTATTACTGCGGTTGGTACGGTAAAAGCAATGGCAGTTGAACCT 1140  
361 S F L V E S I T A V G T V K A M A V E P 380

1141 CAAATGACCCGCTGCTGGGATAATCAATTAGCAGCTTATGTGGTTTCTAGTTTTCGGGTA 1200  
381 Q M T R R W D N Q L A A Y V V S S F R V 400

1201 GCTAAGTTGGCAATGGTTGGGAGCAAGGAGTACAACCTCATTCAAAGATGGTTATTGTG 1260  
401 A K L A M V G Q Q G V Q L I Q K M V I V 420

1261 GCAACTCTATGGATTGGTGCAAAATTGGTAATTGAAGGCAAGCTATCGGTAGGTCAATTA 1320  
421 A T L W I G A K L V I E G K L S V G Q L 440

1321 ATAGCATTTAATATGCTGGCAGGTCAGGTGGCCGCTCCTGTTATCCGCCTGGCACAGCTA 1380  
441 I A F N M L A G Q A A P V I R L A Q L 460

1381 TGGCAAGATTTTCAGCAAGTAGGTATTTAGTGGCGAGATTGGGTGATATTTAAATACT 1440  
461 W Q D F Q Q V G I S V A R L G D I L N T 480

1441 CCAACTGAGCATTCTACATCTCGCTTAACCTTTACCTGATATTAAGGGTGATATTACATTT 1500  
481 P T E H S T S R L T L P D I K G D I T F 500

1501 GAAATGTTGATTTTCGCTACAAAATAGATGGGCATTTAATATTACAGAATTTAAATTTA 1560  
501 E N V D F R Y K I D G H L I L Q N L N L 520

1561 CAGATTAACGCTGGAGAGATACTAGGTATCGTAGGACGCTCTGGTTCAGGTAAATCAACA 1620  
521 Q I N A G E I L G I V G R S G S G K S T 540

1621 TTGACAAAATTAGTACAGCGTTTATATGTACCAGAAAATGGGCGAATATTAGTTGATGGA 1680  
541 L T K L V Q R L Y V P E N G R I L V D G 560

1681 AACGATTTGGCATTAGCTGATCCCGCTTGCTGCGTCCCAAGTGGGTGTTGTTTTGCAG 1740  
561 N D L A L A D P A W L R R Q V G V V L Q 580

1741 GAAATGTGTTACTCAATCGTAGTATTCGAGATAATATTGCCCTAACTGATACGGGCATG 1800  
581 E N V L L N R S I R D N I A L T D T G M 600

1801 TCATTAGAGTTTATTATCCAGGCTGCCAAGATGTCTGGGGCACATGACTTTATTATGGAA 1860  
601 S L E F I I Q A A K M S G A H D F I M E 620

1861 TTGCCTGAGGGTTATGATACGATTGTTGGAGAGCAAGGTGCAGGCTTGTCAGGTGGACAA 1920  
621 L P E G Y D T I V G E Q G A G L S G G Q 640



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FIG. 8-3

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1921 CGCCAGCGTATCGCTATTGCGCGTGCTTTAATTACCAATCCGCGTATTTTGATTTTGGAT 1980  
641 R Q R I A I A R A L I T N P R I L I F D 660

1981 GAAGCTACTAGTGCATTAGACTATGAGTCGGAAAGGGCTATTATGCAAAATATGCAGGCA 2040  
661 E A T S A L D Y E S E R A A M Q N M Q A 680

2041 ATTTGCCAAGGTAGAACAGTGTGATTATTGCACATCGCTTATCTACCGTAAAAATGGCA 2100  
681 I C Q G R T V L I I A H R L S T V K M A 700

2101 CATCGCATTATTGCAATGGACAAGGGGAAAATTGTAGAGCAAGGCACACATCAAGAATTG 2160  
701 H R I I A M D K G K I V E Q G T H Q E L 720

2161 TTGCAAAAAGAAGATGGTTACTATCGTTATTTATATGATTTCAGAATGGATAAA 2215  
721 L Q K E D G Y Y R Y L Y D L Q N G \*



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MbxB	MEANQORND	MAQPPAES	MEELAKMYG	TSASPADDM	HOFSONTKG	DNEIEMML	AAKKEEL	55
LktB	MEANQORND	L...GLVA	ETMEAGYHN	ISLNPEETK	HKFDIDGKG	STAWEL	AAKKEAL	56
ApxB	MEFYRE.ED	M...GLYA	ETILAQYHN	FANPEELK	HKEDLEGKG	DTANIEL	AAKSEEL	55
HlyB	MEFYRE.ED	M...GLYA	ETILAQYHN	MSWPEETK	HRFDIDGKG	GTSWEL	AAKSEEL	55
MbxB	RVKTIKQPL	TRISMETSP	ALWCDNKP	DLDQNLNSH	ELTKIDGV	GSAKKELY	DLEENRP	116
LktB	RVKTIKQPL	SRHLVNEP	ALWQDN..	GRH	ELTKID..	TNNRYELV	NLEODAP	107
ApxB	RVKTIKQPL	DRJAFJALP	ALWRED..	GRH	ELTKID..	NEAKKEELF	DLETHNP	106
HlyB	RVKTIKQPL	DRJAFJALP	ALWRED..	GRH	ELTKID..	KEANRYELF	DLEENRP	106
MbxB	ITEDASERS	ERISSEKME	MTSRASILG	SEAKFDETM	FIPAVIKYR	YEEFEMVFI	SVVKEP	177
LktB	ITEDASERS	ACVGGQLT	MTSRASWVG	QAKEDFTM	FIPAVIKYR	KIFLETITV	SIFELP	168
ApxB	ITEDASERS	SEVGGKLT	MASRASING	KAKEDFTM	FIPAVIKYR	KIFLETITV	SIFELP	167
HlyB	ITEDASERS	ALVGGHTKE	TASRSSVAG	KAKEDFTM	FIPAVIKYR	KIFLETITV	SIFELP	167
MbxB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	ATIALVMSL	FEMT	TYLFAHSTS	REDFVELG	238
LktB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	ATIALVMSL	FEMT	TYLFAHSTS	REDFVELG	229
ApxB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	ATIALVMSL	FEMT	TYLFAHSTS	REDFVELG	228
HlyB	ALTPLEFFQ	VWMDKVLVH	RGESTEDAV	ATIALVMSL	FEMT	TYLFAHSTS	REDFVELG	228
MbxB	APLETHILCA	EPJANFESR	RUGDTVARV	RELEHTRNF	LTGOALTSV	DLVFSFSE	LPWNNV	299
LktB	APLETHILCA	EPJANFESR	RUGDTVARV	RELEHTRNF	LTGOALTSV	DLVFSFSE	LPWNNV	290
ApxB	APLETHILCA	EPJANFESR	RUGDTVARV	RELEHTRNF	LTGOALTSV	DLVFSFSE	LPWNNV	289
HlyB	APLETHILCA	EPJANFESR	RUGDTVARV	RELEHTRNF	LTGOALTSV	DLVFSFSE	LPWNNV	289
MbxB	SPTEFLVMS	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESVFAHSTS	KAMAVEL	360
LktB	SPTEFLVMS	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESVFAHSTS	KAMAVEL	351
ApxB	SPTEFLVMS	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESVFAHSTS	KAMAVEL	350
HlyB	SPTEFLVMS	ASCHILAFM	SAFTSPILR	TRNDQFAR	NAQNGSELY	ESVFAHSTS	KAMAVEL	350

FIG. 9-1



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MbxB	QMTTRRWDNG	LAYVSSSE	RYAKLAWVG	QQGVQLIOK	MUIMATETWE	GAKEVTEGK	LSVIGQL	421
LktB	QMTDINDXG	LASYVSSSE	RYVTLATIG	QQGVQLIOK	TVVWJINWE	GAHLNVSOG	LSIGQL	412
ApxIB	QMTNINDXG	LASYVSSAGE	RYVTLATIG	QQGVQLIOK	VWVWJINWE	GAHLNVSOG	LSIGQL	411
HlyB	QMTNINDXG	LAGYVSSAGE	KVTLATIG	QQGVQLIOK	TVWJINWE	GAHLNVSOG	LSIGQL	411
MbxB	AFENMLAGOV	AAPVIRLAC	LWQDFQOUG	TSVIRLGD	LNJPTHEST	SRLTTPDIK	GDTEFEN	482
LktB	AFENMLSGOV	IAPVIRLAC	LWQDFQOUG	TSVIRLGD	UNSPTEQYQ	GRSLPEIK	GDISEKN	473
ApxIB	AFENMLSGOV	IAPVIRLAC	LWQDFQOUG	TSVIRLGD	LNSPTESYQ	GKALPEIK	GDITERN	472
HlyB	AFENMLAGQII	VARVIRLAC	IMQDFQOUG	TSVIRLGD	ENSPTESYH	GKALPEIN	GDITERN	472
MbxB	VDERYKIDG	HLTEQNINE	QINAGEILG	TVGRSGSGK	STLTIKLQOR	LMPENGRIT	LVGDNDL	543
LktB	TRERYKPDG	PTILNNVNE	ETROGEVIG	TVGRSGSGK	STLTIKLQOR	RYTPENGOM	LDIGHDL	534
ApxIB	TRERYKPDG	PVALNDVNE	STQOGEVIG	TVGRSGSGK	STLTIKLQOR	EYTPENGOM	LDIGHDL	533
HlyB	TRERYKPDG	PVALNDVNE	STQOGEVIG	TVGRSGSGK	STLTIKLQOR	EYTPENGOM	LDIGHDL	533
MbxB	ALADPNWLR	ROVGWVLOQ	NVLNRSIR	DNJALADPG	MSTEFILQCA	AKMSSGANDF	IMELEPEG	604
LktB	ALADPNWLR	ROVGWVLOQ	NVLNRSIR	DNJALADPG	MPMERVLYA	AKLAGAIBDF	ISELREG	595
ApxIB	ALADPNWLR	ROVGWVLOQ	NVLNRSIR	DNJALADPG	MPMERIVHA	AKLAGAIBDF	ISELREG	594
HlyB	ALADPNWLR	ROVGWVLOQ	NVLNRSIR	DNJALADPG	MSVEMVLYA	AKLAGAIBDF	ISELREG	594
MbxB	YNTIVGEQG	AGLSGGGORG	RIATARALI	INPKLLEF	EATSALDYE	SERATONNM	QATIGQR	665
LktB	YNTIVGEQG	AGLSGGGORG	RIATARALI	INPKLLEF	EATSALDYE	SEHITONNM	QKIGQR	656
ApxIB	YNTIVGEQG	AGLSGGGORG	RIATARALI	INPKLLEF	EATSALDYE	SEHITONNM	HQIGQR	655
HlyB	YNTIVGEQG	AGLSGGGORG	RIATARALI	INPKLLEF	EATSALDYE	SEHITONNM	HKIGQR	655
MbxB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	717
LktB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	708
ApxIB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	707
HlyB	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	STVKNADRI	707

FIG. 9-2



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FIG. 10

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1	ATGACGAAAAAGTTTGCAGAGCTAGGTTTAATTGCATGGCTTTGGTCTAACTCTGATATG	60
1	M T K K F A E L G L I A W L W S N S D M	20
61	CATAAACATTGGACGTTGTCTTTGTTTGGACCAATGTTATTCGGCAATTGAGACAGGT	120
21	H K H W T L S L F A T N V I P A I E T G	40
121	CAATATGTTATATTGAAAAGAGAAGATATGCTGTAGCATAATTGAGTGGGCTAAACTT	180
41	Q Y V I L K R E D M P V A Y C S W A K L	60
181	AGTTTAGAAAACGAGGTTAAATATATTAACGATGTTACTTCTCTTAAGTTAGATGACTGG	240
61	S L E N E V K Y I N D V T S L K L D D W	80
241	CAGTCAGGTGACCGAAACTGGTTTATTGACTGGATTGCTCCATTTGGCGATAGTCTTACA	300
81	Q S G D R N W F I D W I A P F G D S L T	100
301	CTCACAAAACACATGAGAACGTTATTTTCAGATGAATTGTTTAGAGCGATTCTGTAGAT	360
101	L T K H M R T L F S D E L F R A I R V D	120
361	GGAAATTCATCGCATGGTAAGATATCTGAATTTTATGGAAAGTCTGTTGATTCAAATAA	420
121	G N S S H G K I S E F Y G K S V D S K L	140
421	GCCTCAAGAATATTTGCACAATATCACGAAGATTTGACGAGCAAATTGTCAACTCAGAAT	480
141	A S R I F A Q Y H E D L T S K L S T Q N	160
481	AATTTTATTATATCTAAAGATAATTAA	507
161	N F I I S K D N *	169



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MbxC	---MTKKFAE	EGJIAJUSN	SOMKXHTES	LFATNYIPAT	ETGOY	42
LktC	--MNQSYENL	CGNITNLMWN	SSLEKENSCE	LFATNYIPAT	ENEROY	43
ApxC	MSKKTNGEEV	EGEVAVHNAS	SPERKOPLES	LFATNYIPAT	ESNOY	45
HlyC	--MNRNPLEV	EGHVSUENAS	SPLEHNVIS	LFATNYIPAT	RANQY	44
MbxC	WILKREDMBV	AYCSWAKES	ENEKYLINBY	TSEKLDIMOS	GDRNW	87
LktC	MLGIDNGIRI	AYCSWADENE	ETEKYITKBI	NSLTPEDKOS	GDRRW	88
ApxC	WILKROGFFRI	AFCSWANONE	ENEKYLIDBY	ASLADDTIS	GDRRW	90
HlyC	ALITRBNYAV	AYCSWANISE	ENEKYLIDBY	TSEKLEDMTES	GORKM	89
MbxC	FIDWIAPEGD	SLTETKMBRT	LESDELFRAT	RUGNSS.HG	KJSEF	131
LktC	ITDWAPEGH	SOLLKXKMCQ	KTPDMIMRSI	REYFKOKELG	KIAYE	133
ApxC	FIDWIAPEGD	SALTKHMRD	NEFNELEFRAT	RVEDPSR.VG	KJSEF	134
HlyC	FIDWIAPEGD	NGALXKMRK	KEDLEFRAT	RVEDPSR.VG	KJSEF	133
MbxC	YKKSVDKLA	SRIIAQYHED	TSKESTONN	FTISKDN	168	
LktC	KGGKIDKITA	KKRIDTYQEE	DATAEKNEN	EKK---	167	
ApxC	HGGKIDKILA	SKITFOYITE	EMSELKONQ	TKESLWNS	172	
HlyC	HGGKIDKILA	NKIKOTHE	ITIEVANKSD	ENESLIG-	170	

FIG. 11





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FIG. 12-1

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1 ATGTTTATACAAGCACTTAAAGATTTTTTTATTCGCTATATAACCGTTTGGCGCAATACA 60  
1 M F I Q A L K D F I R Y I T V W R N T  
61 TGGGCAGTTTCGAGACCAACTAACCCTCCTAAGCGTACTAAAGAAGAACTCGCTTTTCTT 120  
21 W A V R D Q L T P P K R T K E E L A F L 40  
121 CCTGCACATCTAGAACTCACTGACACACCTGTATCCAGATCTTCTAAGTGGACAGCTAGA 180  
41 P A H L E L T D T P V S R S S K W T A R 60  
181 ATAATCATGATATTTGCTCTATTTGCTTTGCTATGGTCTTGGGTTGGACAGATTGACATT 240  
61 I I M I F V L F A L L W S W V G Q I D I 80  
241 GTTGCTACAGCTTCAGGTAAAATTTCTTCAGGTAGCCGTAGCAAGACTATTCAATCTTTG 300  
81 V A T A S G K I S S G S R S K T I Q S L 100  
301 GAAACAGCGATAGTTAAAGCAGTTTATGTACGTGATGGTCAAAATGTTCAACAAGGTGAA 360  
101 E T A I V K A V Y V R D G Q N V Q Q G E 120  
361 ATATTAGTAGATTTAGTGGGAATCGGTTTCAGATAGTGATGTTGCTCAGTCCGAGAAAGCC 420  
121 I L V D L V G I G S D S D V A Q S E K A 140  
421 CTTGAGCAGCGCAATTATCTAAGCTACGCCTGAAGCAATTTTATCAGCATTAAATCAC 480  
141 L R A A Q L S K L R L E A I L S A L N H 160  
481 CGTATTAATCCTCAGATTGATGTAGCATATGCAAAGTCTTTAAATATTTTCAGAATCGGAA 540  
161 R I N P Q I D V A Y A K S L N I S E S E 180  
541 ATTAATGAAGCTCAAACTTTAGCCCAAAATCAATATCAAGCATGGTTAGCACAAAGATGAA 600  
181 I N E A Q T L A Q N Q Y Q A W L A Q D E 200  
601 CAACTAAAATTAACCTTAAAGGACATCAAGCAGAATTACAATCTGCTCGATCCCAAGAA 660  
201 Q L K L T L K G H Q A E L Q S A R S Q E 220  
661 CAAAAGTTGGTTTCAGTTGGTGCAATTGAACATCAAAAGACTGATGATTATCGGAGTCTC 720  
221 Q K L V S V G A I E H Q K T D D Y R S L 240  
721 AAAGCAGAAAATTTTATATCTGAGCATGCTTATCTAGAACAAGAAAGCAAATTACTTAGC 780  
241 K A E N F I S E H A Y L E Q E S K L L S 260  
781 AATCAAAATGATTTACAAAGTACACGTAGTCAGATTCAAAAAATACAGGCTGCAATCATG 840  
261 N Q N D L Q S T R S Q I Q K I Q A A I M 280  
841 CAAGCTGAACAGAACCGTATGTTATATACTCAAAATCTAAAACGTGATACATTAGAATCT 900  
281 Q A E Q N R M L Y T Q N L K R D T L E S 300  
901 TTACGCCAAACCAATGAACAGATTAATCAATATACTGGTCAAACCTAATAAGCTAAGCAG 960  
301 L R Q T N E Q I N Q Y T G Q T N K A K Q 320



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FIG. 12-2

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961 CGACAGAAATTGCTGAGTATTAAATCACCTGTTAATGGTACTATACAAGAGCTAACAGCT 1020  
321 R Q K L L S I K S P V N G T I Q E L T A 340

1021 TATACTTTAGGTGGAGTTGTACAAGCAGCACAAAAATTATGGTTGTGGCACCTAACGAT 1080  
341 Y T L G G V V Q A A Q K I, MAY V A P N D 360

1081 AATCAAGTGAAGTAGAGGTATTAGTGCTAAATAAAGATATCGGCTTTGTAAAAGCTGGG 1140  
361 N Q V E V E V L V L N K D I G F V K A G 380

1141 CAGAATGTTATCATCAAAATCGAGAGTTTTCTTATACACGTTATGGTTATTTAACAGGT 1200  
381 Q N V I I K I E S F P Y T R Y G Y L T G 400

1201 AAAATAAAAAGTATTAGTCATGATGCTATAGAACATCAACATTTAGGTCTAGTGATACT 1260  
401 K I K S I S H D A I E H Q H L G L V Y T 420

1261 GCACTTGTTTCTCTTGATAAAAGCACATTAATATAGATGGAGTAACAATCAACTTAACG 1320  
421 A L V S L D K S T L N I D G V T I N L T 440

1321 CCAGGAATGAATGTTACTGCTGAAATTAACAGGTAAACGTCGTGTTTTGGATTATATA 1380  
441 P G M N V T A E I T G K R R V L D Y I 461

1381 TTAAGTCCATTGCAGACAAAAGTTGATGAAAGTTTTCGAGAACGCTAA 1428  
461 L S P L Q T K V D E S F R E R \* 476



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FIG. 13-1

MbxD	--MFTQALKD	FFIRYIFRWIR	NEMAVRDQIT	PKRTKEELA	SEPAHEUID	48
Lktd	MKTJMSGTYE	FFERYKNIWA	EWIKIRKELD	HNRKIDSE	FLPAHEEET	50
ApxD	MKTJMGLEYE	FFQRYKFWIT	EJMKIRHQED	TPDREKDENE	FLPAHEEET	50
HlyD	MKTJLMGFSE	FLRYKLIWS	EJMKIRKOLD	TPVREKDENE	FLPAHEEET	50
MbxD	TPVSRSSKWT	ARTIMIRVLF	AELWSWGOI	DIYATASGKI	SSGSRSTIQ	98
Lktd	TPVSKRPRL	AYLIMLEW	ATVJASNSKI	EIVATAPGKI	TFSGRSKEIK	100
ApxD	TPVSKRPRL	AYLIMLEW	ALVITISUSHV	EIVATATGKI	AFSDRSKEIK	100
HlyD	TPVSRPRRL	AYFLMGFLVI	AFILSVLGQV	EIVATANGKI	FLSGRSKEIK	100
MbxD	SLEITATVAV	YVRDGGQWQ	GETJVDVIGI	GSDSVAQSE	KAIRAQESK	148
Lktd	PTENATVOET	EYKDGQFVEK	GOLIVSITAI	GSDADIKTM	ASLSTAKLEN	150
ApxD	PTENALVKEI	EYQDGQFVEK	DOLHLITAI	GADADQQGIK	SSLSSTIKLER	150
HlyD	PTENSIVKET	INKEGESVRK	GDVILKLTAL	GAEDITLKIQ	SSILQARLEQ	150
MbxD	LRLLEATISAL	NHRINPQIDV	AYAKSLNIG	ESEINEAQT	AQOQVQAMLA	197
Lktd	YRYQTLITAT	EKESIRVIDU	.SRTEKDDSS	EEDRERIKHI	TEEQVTTWOK	199
ApxD	YRYEELLEAV	AADRPLIEL	.TKDEFKHAT	EEDKTRIRYL	ITEQFEAWOK	199
HlyD	IRYQLESRSI	ELNKLPKKE	PDEPYFQNV	EFEV8LITS	IIKEQFSTWON	200
MbxD	QDEQLKITEK	GHOALQSAR	SQEQALVSIG	AIEHQKTDY	RSEKAENFIS	247
Lktd	QXTRKTLAYK	RKEAEKQTF	ANVRKVEGAT	RILQEKKOF	KALYKQKSLD	249
ApxD	QXQKECALQ	RKEAEKQMI	ANVRKVEGTS	AVENERIKOL	KKLFNSKSTIS	249
HlyD	QXQKSLNID	KKRAERITL	APNRKVENWS	RVEKSRDDE	RSLHKOATA	250
MbxD	ERAYLEQESK	ILSNQNDIQS	TRSQIRKIQOA	ATMQAEQNRM	QVTONLKRIIT	297
Lktd	KHELLAQENK	LTERONAVAV	YRSKENLEN	ELINVRKEHLE	LTTOFFSSDY	299
ApxD	KHDLITQENR	HESAVNELAY	YKSRLENVES	DLRVRKEHIIH	LTTOFFRADT	299
HlyD	KHAYLEQENK	YVEANERIRV	YKSLQEQTES	EIESAKQBYQ	QVTONLKRIIT	300



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FIG. 13-2

MbxD	ESLRQINBO	INQITGQTNK	AKQKQKLLS	KSRVNGTIOE	ETATITLGGW	347
Lktd	LEKIKQHIN	EQQIPRELEK	NNORQOASV	RAPVSGTVOO	LKTHITGGW	349
ApxD	EKLKONVEA	EKQISLELEK	NEORQOASV	RAPVSGTVOO	LKTHITGGW	349
HlyD	DKRQRTIDS	IELLELELEK	NEERQOASV	RAPVSGKVOO	LKTHITGGW	350
MbxD	QAKQKIMWA	PNQNOVEVEV	MLNKQIGFV	KACQWVETKL	ESRPVTRYGX	397
Lktd	TAETLMITIV	PEQDVLEATA	LYPNKQIGFV	AAGQEVLEKV	ETEPVTRYGX	399
ApxD	TAETLMVIA	PEQDVLEATA	LYONKQIGFI	EVQODAVJKN	ETEPVTRYGX	399
HlyD	TAETLMVIV	PEQDVLEATA	LYONKQIGFI	NVGQDALEKV	ETEPVTRYGX	400
MbxD	LGKIKSIESH	DATERQHLEGI	KMTALEVSLDK	SEEN.IDAVT	ENETPBMNKT	446
Lktd	LGRIKHITSP	DATERQPNVGL	VENATIAQOR	KMULTSPEQK	EDLSSENTIL	449
ApxD	LVGKVNITTE	EATERNPQLEGI	VANSETETDR	KYESGKIGKE	TEGGGMSKT	449
HlyD	LVGKVNINL	DATERQKLEGI	VENVANSVEE	NDEST.GNKH	TEPSSGMAVE	449
MbxD	AEIKTGKRRV	LDVII.SPLQT	KNDSEFRER			475
Lktd	AEIKTGERSV	MSXLTSPLEF	SVTPEFRER			478
ApxD	AEIKTGERSV	TSYCLSPLEF	SVSESSRER			478
HlyD	AEIKTGERSV	TSYCLSPLEF	SVTSESSER			478



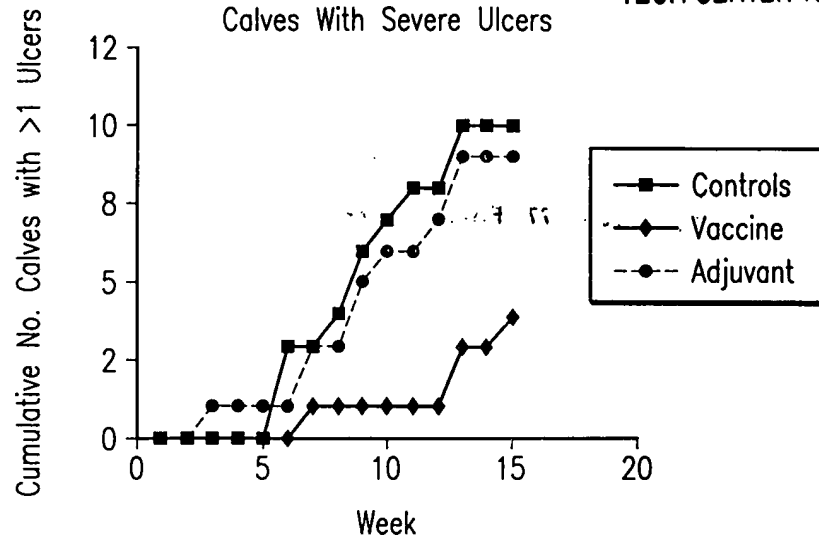
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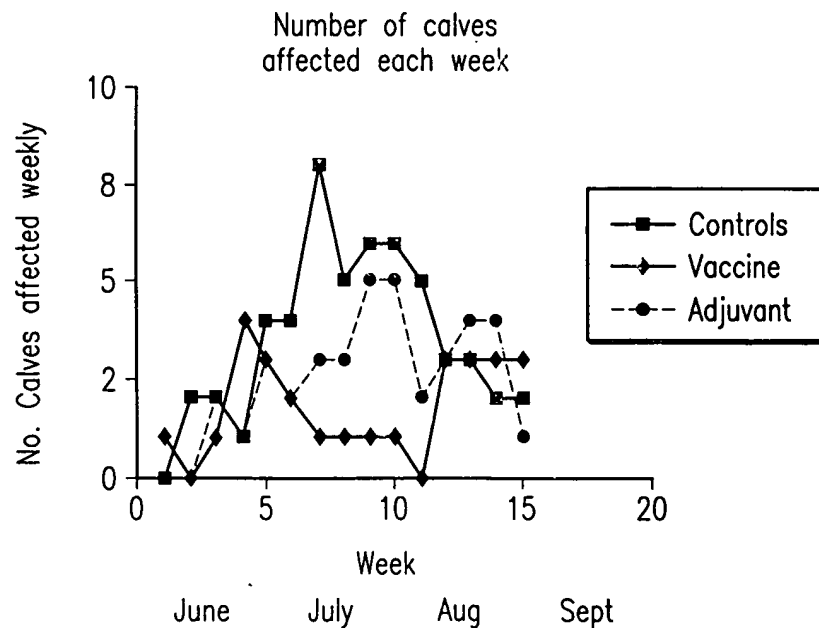
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Cumulative Number of  
Calves With Severe Ulcers



Number of calves with ulcers with clinical scores  $> +2$

FIG. 14



Number of calves affected weekly in 1 group of vaccinated calves and in controls.

FIG. 15

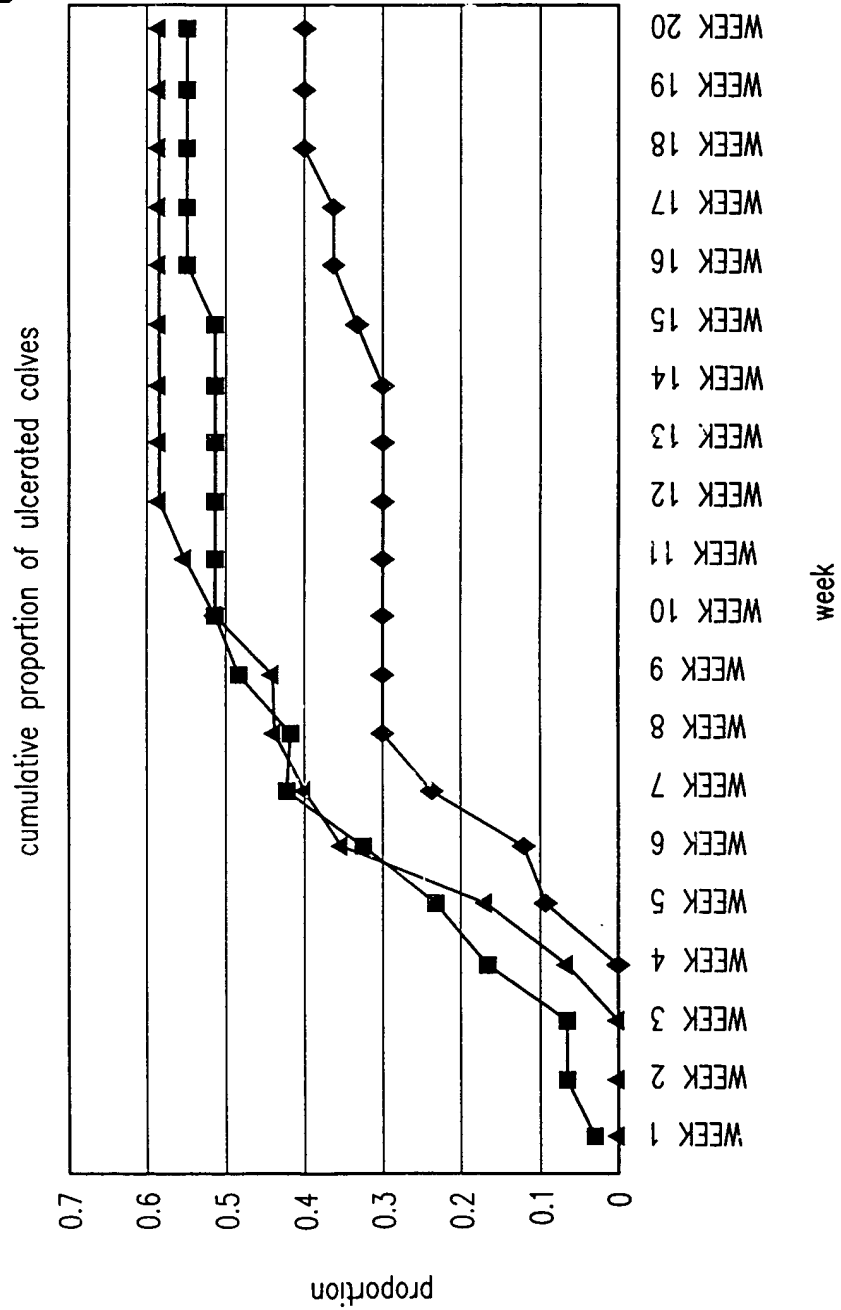
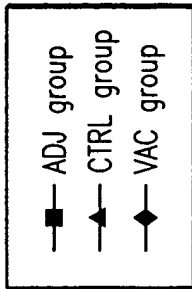


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